

REMARKS

The present claims relate to a positive electrode for a non-aqueous electrolyte primary battery, a method of producing a positive electrode for a non-aqueous electrolyte primary battery, a non-aqueous electrolyte primary battery, a positive electrode for a non-aqueous electrolyte secondary battery, a method of producing a positive electrode for a non-aqueous electrolyte secondary battery, and a non-aqueous electrolyte secondary battery.

Amendment summary

Upon entry of this Amendment, claims 1-26 will be pending.

Claim 14 is amended to incorporate the subject matter of Claim 17.

Claim 20 is amended to remove an improper multiple dependency.

Claim 26 is amended to correct formatting errors.

No new matter is added by this Amendment, and Applicants respectfully submit that entry of this Amendment is proper.

Status of the claims

Claims 14 and 15 have been rejected under 35 U.S.C. § 102 as allegedly being anticipated by JP 2001-283861 (hereinafter "JP '861"). Claim 16 has been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over JP '861 in view of JP 63-121250 (hereinafter "JP '250").

Response to claim rejections

Applicants respectfully submit that neither JP '861 nor JP '250 anticipates or renders obvious the presently claimed invention because neither reference teaches or suggests the presently claimed product produced by the method recited in the present claims.

Independent Claim 14 relates to a positive electrode for a non-aqueous electrolyte secondary battery, characterized in that at least one metal oxide selected from the group consisting of titanium oxide, alumina, zinc oxide, chromium oxide, lithium oxide, nickel oxide, copper oxide and iron oxide is dispersed between particles of at least one lithium-containing composite oxide selected from the group consisting of LiCoO_2 , LiNiO_2 and LiMn_2O_4 . The positive electrode is produced by a method comprising the steps of (I) a step of producing a mixed solution by adding at least one lithium-containing composite oxide selected from the group consisting of LiCoO_2 , LiNiO_2 and LiMn_2O_4 and an alkoxide of at least one metal selected from the group consisting of titanium, aluminum, zinc, chromium, lithium, nickel, copper and iron to an organic solvent and mixing them; (II) a step of adding water to the mixed solution to produce a metal hydroxide; (III) a step of changing the resulting metal hydroxide into a metal oxide by heating and drying a solution containing the metal hydroxide and dispersing the metal oxide between particles of manganese dioxide to produce powder for a positive electrode; and (IV) a step of shaping the powder for a positive electrode to produce a positive electrode.

The present invention provides for the dispersion of fine particles of the recited metal oxide between particles of the recited lithium-containing composite oxide, which improves the discharge-recharge capacity. Specifically, the dispersion of fine particles of the recited metal oxide produces gaps between the particles of the recited lithium-containing composite oxide. Electrolyte can efficiently penetrate into the gaps, which results in an increased contact area

between the electrolyte and the lithium-containing composite oxide. Accordingly, the utilization ratio of the lithium-containing composite oxide can be increased, which improves the discharge-recharge capacity. The powder that is obtained by dispersing the fine powder of the metal oxide between the particles of the lithium-containing composite oxide may be shaped to form the positive electrode.

Applicants respectfully submit that neither JP '861 nor JP '250 disclose an electrode formed using the process described above.

JP '861 describes an electrode for a battery made by forming an active substance-containing electrode binder layer on a collector, characterized in that the electrode binder layer contains an inorganic compound having a dielectric constant of not less than 12 (see Claim 1 of JP '861). JP '861 further discloses the manner in which the positive electrode is prepared (see Paragraph No. [0055]). First, LiCO_3 and CoCO_3 are mixed at a molar ratio of 0.5:1.0 and fired in air at 900°C for 5 hours to prepare LiCoO_2 . Then, 86 parts by weight of LiCoO_2 is mixed with 6 parts by weight of graphite as an electrically conductive agent and 3 parts by weight of polyvinylidene fluoride as a binding agent to prepare a positive electrode binder. Next, it is dispersed into N-methyl-2-pyrrolidone to form a slurry. Then, 5 parts by weight of BaTiO_3 is added thereto and dispersed therein uniformly. It is uniformly applied onto a one-side surface of band-shaped aluminum foil having a thickness of $20\text{ }\mu\text{m}$ as a positive electrode collector and dried and then shaped under compression by means of a roll pressing machine to prepare a positive electrode.

Applicants respectfully submit that JP '861 does not anticipate or render obvious the presently claimed invention because the construction of the positive electrode in JP '861 is

different from that of the presently claimed invention. In addition, the advantageous properties of the present invention (discussed, in part, above) are not taught nor suggested by JP '861.

Applicants also respectfully submit that JP '250 does not cure the deficiencies of JP '861. JP '250 discloses a non-aqueous electrolyte battery comprising a negative electrode containing lithium as an active substance, a positive electrode containing manganese dioxide as an active substance and a non-aqueous electrolyte, characterized in that an oxide having a potential lower than that of manganese dioxide as a potential to lithium in the non-aqueous electrolyte is added to the positive electrode. JP '250 accordingly does not cure the deficiencies found within JP '861.

In view of the above, Applicants respectfully submit that the presently claimed invention is neither anticipated by, nor rendered obvious by JP '861 or JP '250, either alone or in combination.

Applicants respectfully request the reconsideration and withdrawal of the §§ 102 and 103 rejections set forth in the Office Action.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

AMENDMENT UNDER 37 C.F.R. § 1.111
Application No.: 10/505,422

Attorney Docket No.: Q83115

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.


Respectfully submitted,

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE

23373

CUSTOMER NUMBER


John T. Callahan
Registration No. 32,607

Date: September 4, 2007